DOE/SPR/EA-1505-MAP

Mitigation Action Plan for the Project to Increase the Facility Capacity and Inventory at the Bryan Mound Storage Facility

U.S. Department of Energy

Strategic Petroleum Reserve

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Introduction

The crude oil (oil) currently stored by the Strategic Petroleum Reserve (SPR) in salt caverns along the Louisiana (LA) and Texas (TX) Gulf Coast serves to offset the effects of a significant oil supply interruption. Due to the location of these reserves, oil can be distributed through interstate pipelines to nearly half of the Nation's oil refineries or transported via barge /ship to more remote refineries. Currently, the SPR includes four Gulf Coast underground salt dome oil storage facilities in LA and TX and a project management facility in LA. The history of the SPR, a general description of the Bryan Mound (BM) storage facility (facility) and the proposed action is provided below.

History and Background

The creation of the SPR was mandated by Congress as part of the Energy Policy and Conservation Act (EPCA) on December 22, 1975. The objective of the SPR is to provide the United States with oil should a supply disruption occur. It is anticipated the SPR's **** million cubic meters (m^3) [**** million barrels (MMB)] capacity will be reached by 2005. Of the four SPR oil storage facilities in LA and TX, the BM facility is the facility at which the proposed action will occur.

The BM facility is located in ********* County, TX, on the ******* River Diversion Channel. The BM facility occupies 500 acres and almost encompasses the entire BM salt dome. Development of the facility was initiated in 1977 and operations commenced in 1979. The facility has ** underground solution-mined storage caverns with a combined storage capacity of ******* million m^3 (***** MMB) of oil and the capability to drawdown and deliver oil at a rate of **** MMB per day. A site map is provided as Figure 1-2 in environmental assessment (EA), DOE/EA-1505, which was prepared to evaluate the potential environmental impacts associated with the proposed action.

Consistent with the original maximum storage capacity designation and EPCA, the Department of Energy (DOE) is proposing activities to increase storage capacity and, upon Administration authorization, petroleum inventory at the BM facility by 3.5 million m^3 (22 MMB). Under the proposed action, there are two distinct actions, the action to increase the facility capacity and the action to increase the facility's petroleum inventory. A portion of the proposed increase in facility capacity would be obtained by modifying the existing internal cavern infrastructure in 10 caverns (caverns 4, 5,105, 106, 108, 109, 110, 114, 115, and 116) via cavern workovers [1.4 Million m^3 (8.8 MMB)]. The balance of the proposed increase to facility capacity, 2.1 million m^3 (13.2 MMB), would result from administrative activities, i.e. permitting, only. These include the return of cavern 112 to service at its full capacity [1.9 million m^3 (12 MMB)] and volume upgrades of 0.19 million m^3 (1.2 MMB) based on new information obtained during sonar investigation of caverns 2, 113, 101, 102, 103, 104, 107, and 111. The final action associated with implementation of the proposed action is to increase facility inventory by 3.5 million m^3 (22 MMB) of oil. This final action will only commence upon the express authorization of the Administration.

During analysis of the proposed action in DOE/EA-1505, it was determined that mitigation of impacts to ambient air resulting from emission of volatile organic compounds (VOC) was

necessary if the BM facility were to remain a minor source of air emissions. Based on classification of the BM facility as a minor source, actual emissions of VOC resulting from all actions associated with the proposed action cannot exceed 3.23 tons per year (TPY). Preliminary calculations of VOC emissions indicate that emissions for the proposed action will exceed this threshold if the proposed action proceeds on the proposed four year schedule.

It is the intent of the DOE to conduct all activities associated with increasing facility capacity (workovers) and petroleum inventory (future fill) without altering the classification of the facility as a "minor source" of air emissions. A brief description of the intended mitigation activities was provided in the EA (Section 5.2). The details are provided in the following sections of this Mitigation Action Plan (MAP).

Mitigation Commitments

Mitigation activities considered and evaluated included vapor recovery coupled with the use of a flare, vapor recovery coupled with the use of an activated carbon filter system and use of a closed containment system to prevent exposure of VOCs to the environment (two options, use of a bladder tank and de-pressuring to BM site oil tanks). Initially, vapor recovery coupled with the use of a flare was determined to be preferable on both an environmental and cost basis and was selected to be the primary mitigation activity. However, the use of a closed containment system by routing of oil to site floating roof tanks was determined to be feasible and became the preferred primary mitigation activity on both an environmental and cost basis.

In general, the overall characteristics of the closed containment system make it a superior mitigation activity. Specifically, the use of the closed containment system requires only a minor modification to existing procedures and equipment, which greatly decreases the cost of implementation, while preventing VOC emissions from oil transfers during workovers. In the unlikely event that this preferred primary mitigation activity could not be utilized, the alternate mitigation activity, vapor recovery coupled with use of a flare would be considered, so both are described in this section and the subsequent section of this MAP.

Regardless of the preferred primary mitigation activity utilized, mitigation activities in general for the proposed action will be twofold. In the field, these activities will likely be comprised of use of a closed containment system to route oil displaced during cavern workovers to the BM site oil tanks, mitigating VOC emissions by preventing exposure of VOC emissions to the environment during workover activities. As well, administratively, scheduling of specific activities will be employed to reduce impact to air quality from VOC emissions in any given year.

The closed containment system that was ultimately chosen as the preferred method to mitigate VOC emissions is comprised of utilization of a centrifugal pump to transfer the oil displaced during depressurization to the BM site oil tanks. This temporary pumping system will pump oil into the normal site oil fluid transfer headers, which will be used to route oil into the BM site oil tanks. Based on total displacement of approximately 75,000 barrels of oil during implementation of the proposed action, additional VOC emissions from the BM site oil tanks are estimated to be minimal, approximately 0.36 metric tons (mtons) (0.4 tons). Refer to Table 5-3 of the EA for the estimated additional VOC emissions from the BM site oil tanks

when mitigation activities comprised of a closed containment system are initiated. This is due to the cooling of the oil as it enters the tank.

If tank lineup is not available, the same closed system with centrifugal pumps in series and a positive displacement pump will be utilized. However, this temporary pumping system will pump oil into the same site oil transfer headers, which will then route oil directly to another cavern. No emissions are anticipated to result from this option.

A fractionation (frac) tank will be available in the closed containment system only for wellhead overflow and pressure relief valve discharge. Oil will only be routed to a frac tank to prevent spillage in the event of an unanticipated system back pressure. Since the only modification to the normal workover configuration is the use of a frac tank bypass line as the primary fluid movement route, this presents no new environmental aspects and/or impacts.

The flaring system that was initially chosen as the preferred method to mitigate VOC emissions is now the preferred alternative for mitigation of VOCs. It is comprised of a trailer-mounted flare sited off the wellpad for the cavern being worked over that can handle five to eight million standard cubic feet per day with 98% VOC destruction. Refer to Table 5-4 of the EA for the estimated VOC emissions per workover by cavern when mitigation activities comprised of a vapor recovery system coupled with use of a flare are initiated. These estimated VOC emissions are approximately 0.07 mtons (0.08 tons) with negligible nitrogen oxide and carbon monoxide production (Refer to Table 5-5 of the EA). The vapor recovery and flaring system would include the flare stack and associated support equipment such as a non-sparking blower with diesel engine, a bi-directional API- and USCG-accepted detonation arrestor and a propane or natural gas pilot. Process safety devices that are anticipated include a flame arrestor on the gas outlet of the frac tank and a nitrogen purge on the frac tank. Determination of potential hazards associated with the final design of this system would be required prior to implementation to ensure worker health and safety and environmental risks.

As stated previously, scheduling will also be employed to mitigate the impacts to air quality as a result of VOC emissions. The permitted emissions for the BM facility are based on the calendar year. Thus, activities associated with the proposed action may be scheduled to occur over more than one calendar year to assist with remaining in compliance with the site air quality permit and the proposed project schedule. The logistics and scheduling of the distinct activities of the proposed action, i.e. workovers and fill, will be coordinated with environmental personnel to ensure that there is the requisite awareness of air quality and permit limitations for VOC emissions. Moreover, activities at the facility will be performed with similar awareness of the potential impacts to air quality and permit compliance issues in an effort to reduce the environmental impacts of the proposed action and maintain compliance.

Mitigation Action Plan Implementation And Reporting

The management and operations contractor shall secure all necessary permits to implement mitigation activities as required by applicable Federal, State, and local environmental laws, orders, and regulations. Any mitigation conditions set forth in permits issued for the project and/or MAP will be complied with for the duration of the proposed action. The SPR will use existing organizational and administrative controls to gather and report information regarding

implementation and status of mitigation actions. Such controls include applicable review and reporting systems, inspections, etc.

The closed containment system process will be covered by existing environmental and safety and health controls as it represents only a minor modification to the existing workover configuration. Prior to the implementation of the closed containment system, a specific fluid movement plan for this mitigation activity will, however, be developed and approved at the BM facility. Reporting requirements will be satisfied by reporting all emissions associated with implementation of the proposed action from the BM site oil tanks to the Texas Commission on Environmental Quality (TCEQ) in the annual Emission Inventory Questionnaire (EIQ). These emissions are estimations derived via calculations based on EPA factors (AP-42) and recordation of fluid movements associated with the proposed action's workovers.

Should the vapor recovery option be designated as the preferred primary mitigation activity at a later date, the extensive SPR design review process will be employed during design of the flaring system to ensure that all potential aspects and impacts of the flare design and operation are recognized and addressed prior to implementation. A Hazard and Operability (HAZOP) analysis on the flaring system will also be conducted under OSHA process safety management to ensure the safety integrity of the designed process and mitigation of environmental upsets. Additionally, a readiness review board (RRB) will be conducted prior to commencement of the proposed action as a final evaluation of the potential aspects and impacts of operating the flaring system, serving to ensure that all necessary training on the safe and environmentally correct operation of the flaring system and procedures such as operating procedures inclusive of the results of the hazard review and the vendor/manufacturer's operating and safety information have been completed prior to operation of the flaring system. Site operators and other personnel would, in cooperation with New Orleans environmental and engineering personnel, implement the flaring system in accordance with the established design and operating procedures during cavern de-pressuring and workovers associated with the proposed action. Finally, reporting requirements would be satisfied by reporting all flare emissions to the TCEQ in the annual EIQ. These emissions are estimations derived via calculations based on EPA factors (AP-42), vendor certification of the destruction efficiency of the flaring system, and recordation of fluid movements associated with the proposed action's workovers.

Upon implementation of any mitigation activity, the SPR will report all mitigation results in its Annual Site Environmental Report (ASER) published by October 1 of each year in accordance with Section 5.d.(11)(f) of DOE Order 451.1B, the National Environmental Policy Act Compliance Program. Additionally, new information and/or changed circumstances should also be reflected in this annual report along with any major changes to the mitigation activities included in this MAP, if necessary. These changes will then be incorporated in either an updated MAP or other procedure. When mitigation actions are completed, the information will be included in the ASER.